Science is simple

junior and middle grades

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Junior 5

First term



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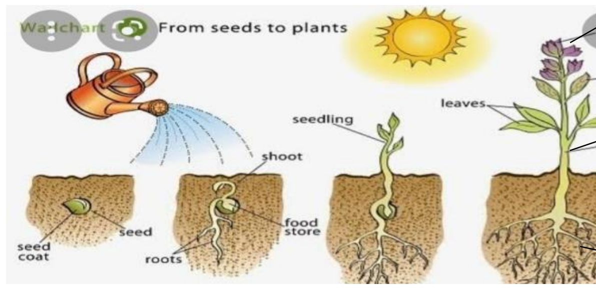
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Concept 1: Plant needs

- What is the plant need to grow?

- Plants need: -
  1. Water.
  2. Air.
  3. Sunlight.
  4. Space.



- **the plant consists of: -**

1- Roots 2- stem 3- leaves 4- flowers or fruit

- **These parts of plants are <u>specialized</u>, which mean: -**
- **Each part has a <u>specific function as: -</u>**

❖ **Root: help plant to get <u>*water*</u> and <u>*nutrients.*</u>**
❖ **Other parts of the plant: help it to survive.**

- **Parts of plant are working together to perform the <u>*vital processes.*</u>**

Grow: ينمو specialized: متخصص specific function: وظيفة محددة

Nutrients: عناصر غذائية together: معا

vital processes : (العمليات التي تميز الكائن الحي مثل التنفس و النمو) عمليات حيوية

- ***Plants are unique living organisms.*** ***G.R?***

- Because they can make their own food through photosynthesis process.

- When you plant a tree, it begins to grow from a seedling to mature tree.

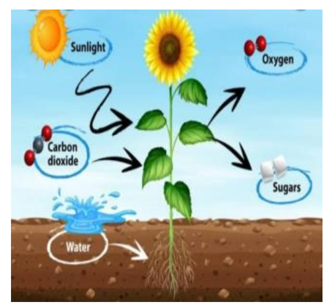
- The tree depends on natural resources such as air, water and sunlight to make its food.

❖ Plant needs some resources to grow: -

1- Water 2- nutrients 3- carbon dioxide gas 4-sunlight.

- **Plant food.**

- Plant`s food is a type of sugar called (glucose).
- This sugar is formed inside plant **leaves** through a photosynthesis process.
- Roots of plants absorb water and nutrients from soil, then they reach leaves through the stem.



- Why do plants need food?
- Plants need food to get energy to grow.

- In which part of plant photosynthesis process take place?
- It takes place in plant ***leaves.***

- **Plants and animals: -**

- Water and air are basic needs for human, animals and plants.
- Human and animals need to eat to get energy to live and grow.
- Plants make their food (sugar) by mean of photosynthesis.

take place: يحدث **mature:** ناضج **seedling:** شتلة

energy: طاقة **by mean of:** بواسطة **unique:** فريد

• *Lesson 2 (do plants need soil?)*

- What is meant by germinating?

- It means that plant sprouts and begins to grow of a *seed*.

• Growth of some seeds in paper towel and other seeds in soil: -

1. Plant some seeds in paper towel inside a plate.
2. Plant another seed in a cup contain soil.
3. Provide the cup and plate with water and sunlight.
4. Compare between growth of seeds in paper towel and their growth in a soil.





• Observation after 7 days: -

- The initial growth is similar in both seeds.



• Observation after 14 days: -

- Growth of seeds that planted in soil is better than growth of other seeds that planted in a paper towel.

Germinating: انماء　　sprout: ينبت　　begin: تبدأ

Provide: يزود　　growth: نمو　　observation: مشاهدة

Initial growth: نمو أولى　　similar: متشابه　　better than: أفضل من

- **Conclusion: -**

A) The seed can grow without soil if it has: -

1. Water.
2. Sunlight.
3. Suitable medium.

B) Plants can grow without soil for a while but finally they need soil. G.R?

- Because soil contain minerals that necessary for continuity of growth.

- Enrichment information: for reading only

Hydroponic system: place full of water that contain the necessary minerals for plants to grow.

- Hydroponic system is used instead of soil for plants to grow.





Suitable medium: وسط مناسب   a while: فترة   contain: يحتوي علي

Continuity: استمرار   hydroponic system: نظام الزراعة المائية

necessary: ضروري   instead of: بدلا من

sun light (a basic need)

Photosynthesis.

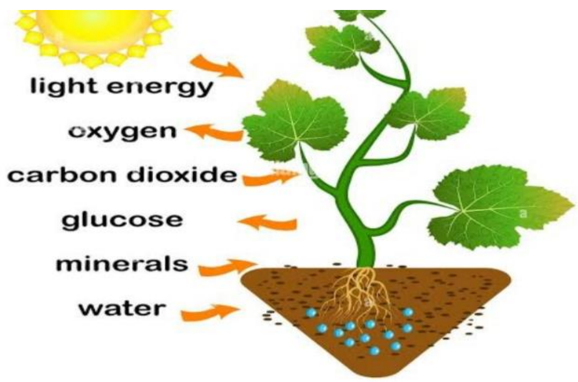
- The process by which plants use the energy of <u>sunlight</u> to make their own food.

- Green plants get: -

1. Sunlight. (through leaves)
2. Carbon dioxide from air. (through leaves)
3. Water and minerals from soil. (through roots)

- Inside the leaves of green plants, the energy of sunlight allows carbon dioxide gas to combine with water to produce:

1- ***Sugar*** provide plant with the needed energy to grow.
2- ***Oxygen gas*** is released to help living organisms breathe.



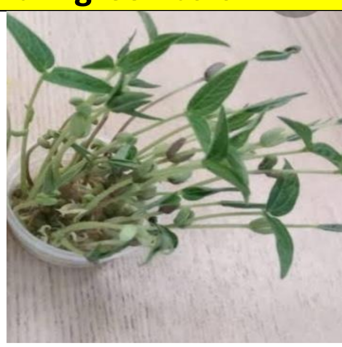
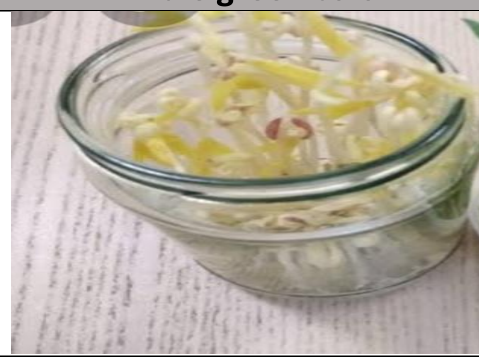
Sunlight + carbon dioxide + water ⟶ sugar + oxygen

Energy: طاقة **combine:** يتحد او يندمج **inside:** داخل

Released: ينطلق **breathe:** يتنفس

- **Effect of light on plant growth: -**
  1. Plant two seeds in two cups that contain soil.
  2. Put one cup where it will receive light and put the other cup in the dark.
  3. Water the both regularly to moisten the soil.
  4. Record your observations along two weeks.

- **Observation: -**

Plant in presence of light	Plant in absence of light
- **Tall.**	- **Short.**
- **More leaves.**	- **Less number of leaves.**
- **Dark green color.**	- **Pale green color.**
	

- Conclusion: -

1.<u>Sunlight</u>, water, air and nutrients are basic needs for plants.

2.Plant without light does not grow well. G.R?

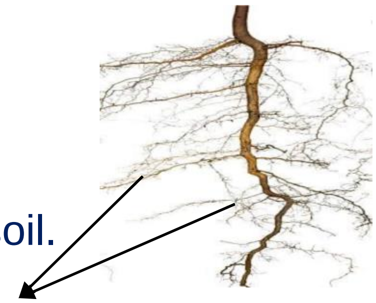
- *Because plants use the energy of light to make their own food.*

Regularly: بانتظام   pale green: اخضر باهت   moisten: يبلل

• *Lesson 3: parts of plants*

- There are three main parts of plant: -

1. Roots 2. Stems 3. Leaves



• Roots: -

- What are the functions of roots?
  1. ***Fixing*** plant in the soil.
  2. ***Absorbing*** water and nutrients from the soil.

- Roots have hair-like structures called **(root hairs). G.R?**

- To increase the amount of absorbed water and nutrients.

• Plant stem: -



- Water and nutrients move up the plant`s stem through vessels called **(xylem)**
- Smaller vessels of xylem connect the stem to leaves.

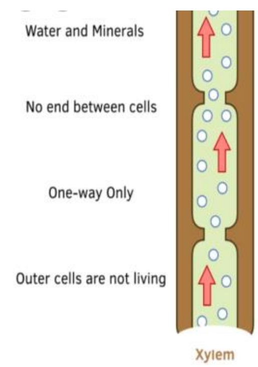


Fig 1. Xylem Vessels.

- What are the functions of stems?
  1. ***Transport*** water and nutrients from roots to the rest of plant by mean of **xylem**.
  2. ***Support*** leaves and flowers.

Rest: بقية xylem: نسيج الخشب vessels: اوعية tiny: صغيرة

Fixing: تثبيت absorbing: امتصاص root hairs: شعيرات جذرية

Main: رئيسى increase: يزيد transport: ينقل

Support: يدعم xylem: نسيج الخشب

- **Forms of stems: -**




1- **Wood stem** like tree trunks and shrubs.



2- **Upright stem** like most flowers.



3- **Climb stems like** vines and grapes.



4- **Tubers:** type of stems that extend Underground like potato plant.



5- **Runners:** type of stems that extend above and along the ground. (strawberry)

Wood stem: ساق خشبية	trunk: جذع	shrubs: شجيرات
Upright: ساق رأسية	vine: عنب	climb stem: ساق متسلقة
Tubers: درنات	extend: تمتد	runners: سيقان مدادات

- **Leaves: - (factory of food)**

➢ What is the function of leaves?

- ***making*** food for plant by mean of photosynthesis process.

➢ Leaves have a green color. G.R?

Due to the presence of **chlorophyll.**

- **Chlorophyll:** capture the energy from the sunlight.

➢ How are gases move into and out of the plant?

- *Through tiny pores on the surface of leaves called* ***stomata****.*

Stomata*: tiny pores on the surface of leaves that allow gases move into and out of the plant.*

❖ **Kinds of leaves: -**



1. **Flat, wide** leaves.



2. **Narrow** leaves (needle leaves of pine tree).

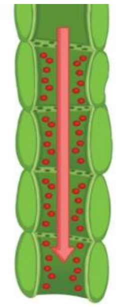
- ***Roots,* xylem** and ***smaller vessels of xylem*** help leaves to get water and nutrients from soil.

➢ ***Leaves produce nutrients such as (sugar – starches – fats – proteins) during photosynthesis process.***

Flat: مسطحة wide: عريضة narrow: ضيق needle: ابرية

stomata: ثغور nutrients: عناصر غذائية

- **After photosynthesis is completed: -**



Phloem: tubes that transport food **downward,** from leaves to other parts of plant.

- Life without plants would be impossible. G.R?

1. Because plants produce oxygen gas that human and animal need to breath.
2. Human and animals depend on plant to eat.

- **Activity (10): -(up the stem)**

- **How water and nutrients move from roots to other parts of plant.**

1. Add some drops of food coloring to cup of water.
2. Cut about 2cm of the bottom of the stalk.
3. Leave the stalk in the water for 24 hours.
4. Cut across the celery stalk about 5 cm up from the bottom.



- **Observation: -**

1. The color of **xylem** and **leaves** will be turned into the same color of the water.

- **Conclusion: -**

  - **Water is transported through the xylem in the stem and reach leaves through smaller vessels of xylem.**

Phloem: لحاء **downward: لاسفل** **turned into: يتحول الي**

Lesson (4): plant and human systems

- **Human and plants** need water and (gases) air to live and **grow.**

1- Plants: -

- Plants get the energy from **manufacturing glucose** during photosynthesis.
- **Glucose:** plant`s sugar that formed from photosynthesis and provides energy for plant to grow.
- **Gases** pass into plant through ***(stomata) in leaves.***

2- Humans: -

- **Human must eat food to get energy.**
- **They chew, swallow and digest food.**
- **Food turned into nutrients to be absorbed into the blood.**

- Air enters the body through **nose** and **mouth** then travel to lungs.
- Inside lungs: **oxygen** is absorbed into circulating blood.

Manufacturing: تصنيع	**pass: يمر**	**chew: يمضغ**
Swallow: يبتلع	**circulating: دائر**	**blood: دم**

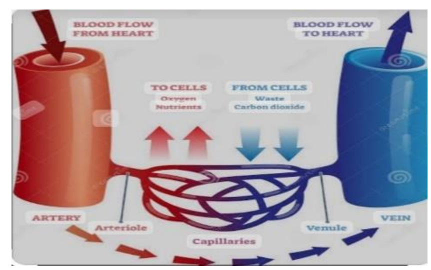


- ***Human circulatory system: -***

1- It's the system that transport oxygen and Nutrients through the blood to the body cells.
2- It consists of heart and blood vessels.

- ***Heart:***
  - Its function: pumping blood to all body cells then receive it again. (blood circulation)
  - It consists of four (4) champers: -
    - **Two upper called atria.**
    - **Two lower called ventricle**

- **There are *three* different types of vessels: -**



1. Arteries:
- Carry blood that is rich in **oxygen** and **nutrients** from the heart to body cells.

2. Veins.
- Carry blood that is rich in **carbon dioxide** and **low** in oxygen and nutrients. Return back to heart then to lungs.
- The blood carries oxygen again at lungs.
  - **Blood is a fluid that move in one direction in arteries or veins.**

3. Blood capillaries:
- Tiny blood vessels that connect ***arteries*** to ***veins.***

Rich in: غنى ب *blood vessels:* اوعية دموية *cell:* خلايا

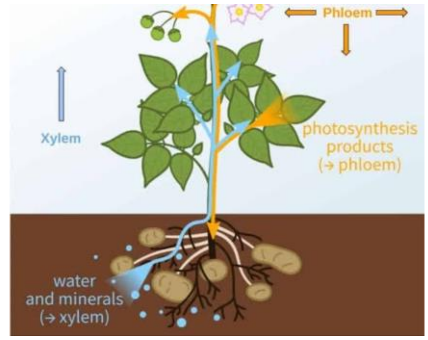
Arteries: شرايين *veins:* أوردة *skin:* جلد *circulatory:* دورى

Atria: أذينان *ventricles:* بطينان *capillaries:* شعيرات

- ***Transport system in plants (vascular system)***

- It is similar to circulatory system in humans.
- It contains one-way vessels that transport the important materials between different parts in plant.

- *Vessels of transport system are: -*



1. ***Xylem:*** that transport water and nutrients from roots to the leaves.

2. ***Phloem***: that transport sugar from leaves to other parts of plant.

P.O.C	Plant transport system	Human circulatory system
Similarities	- Both have one-way vessels. - Both are responsible for transport water, nutrients and gases.	
Differences	- It Consists of vessels (xylem and phloem) that transport materials inside plant.	- System that moves blood around the human body carrying the important materials (food- gases- etc) to and out of the body
	- ***Xylem*** : carry water and nutrients from roots to leaves.	- ***Arteries:*** carry blood rich in oxygen and digested food (simple nutrients) from heart to all body parts.
	- ***Phloem:*** carry sugar from leaves to the rest of plant.	- ***Veins:*** carry blood rich in carbon dioxide gas and low in nutrients from body cells back to the heart.

Vascular: وعائى **one-way** اتجاه واحد **rich in:** غنى ب

Low: قليل **similarities:** أوجه الشبه **differences:** اوجه الاختلاف

- ***Glucose for the energy: -***

- Glucose sugar is used by plant cells as food to live and grow.
- Sunlight is the energy source in photosynthesis.
- Light energy from sun is converted into stored chemical energy inside the sugar during photosynthesis process.
- After photosynthesis is completed, **water** and **oxygen** gas are released in air.

- Human and animals depend on oxygen gas for respiration.

- Rearrange the following sentences depending on your understanding.

(….) plant produce sugar and oxygen gas.
(….) leaves collect carbon dioxide, sunlight from air and water from root.
(….) photosynthesis process takes place.
(….) plant cells use sugar to grow and human use oxygen to breath.

Plant cells: خلايا النبات source: مصدر converted: تتحول
Stored: مخزنة released: يطلق depend on: يعتمد علي
Respiration: تنفس takes place: تحدث

• *Flowers and seeds.*

- Flowers may be: -

1. Large colorful.
2. Very small (grasses)
3. Not very colorful.





- ***Flowers** are the reproductive organs of many plants.*
- ***Plant reproduction:** process of making new plant.*

- Function of flowers: -
  - Producing seeds that help plant to reproduce.

- Seeds can grow into new plant when they receive: -

1. Air 2. Water 3. Suitable temperature.



- In sunflower, seeds are **dark-colored** objects in the center of flower.
- Mature plants use the food to produce flowers.

Colorful: ملون **grasses: اعشاب** **organs: اعضاء** **reproduction: تكاثر**

Suitable: مناسب **temperature: درجة حرارة** **sunflower: دوار الشمس** **mature: ناضج**

• Lesson 5: seed dispersal.

Seed dispersal: when seeds are transported from one place to another.

- ***Methods of dispersal in nature: -***
  1. Floating on water (rivers or lakes).
  2. Transportation by wind.
  3. Sticking to human clothes or animal`s fur.
  4. Eaten by animals and comes out with their stool.

Seed name.		*Way of seed dispersal*
1. Coconut.		*- Floating on water.*
2. Maple.		*- Transported by wind. G.R?* *- Because they are light seeds.*
3. Dandelion.		
4. Burr.		*- Sticking to animal`s fur or human clothes. G.R?* *- Because they have spines.*
5. Tomato.		*- Being eaten by animals. G.R?* *- They are found inside the fruit.*
6. Apple.		

Dispersal: انتشار   *float:* يطفو   *stick:* تلتصق

Concept 2 energy flow in the ecosystem

- lesson one

- **What is meant by Ecosystem?**

- it is an area that contain living organisms and non-living things that interact with each other.

components of ecosystem

(living organisms)	(non-living things)
1. human	1. air.
2. animals.	2.water.
3. plants	3. soil.

- the interaction between these components depends on the energy flow in the ecosystem: -

1. When animals eat plants. (energy moves from plants to animals).
2. When predators eat their preys. (energy moves between animals).
3. When the organism die. (energy returned to soil).

Ecosystem: نظام بيئى

interaction: تفاعل

Components: مكونات

flow: سريان او تدفق

Predator:مفترس

prey: فريسة

returned: يعود

- ***How hawks get energy.***

- *Hawks get energy from eating animals such as: -*

1. Snakes 2. Mice 3. Fish 4. Birds 5. Squirrels
6. Rabbits and other small ground animals.

- Although hawks don’t eat plants, they depend on plants for energy. G.R?

- Because they eat animals who eat plants.



- Predators that can attack hawks: -
- Few predators such as eagles or other hawks.

- When hawk dies, it decomposes and the energy return back to soil.

Squirrel: سنجاب depend on: يعتمد على predators: مفترسات

Attack: يهاجم eagles: نسر decompose: يتحلل

Activity (5): -

- **Ecosystem providesː -**

1.food 2. Water 3. Shelter to its all living organisms.

- **Examples of ecosystems: -**

- **Desert.** - **Rainforest.** - **Ocean.** - **Tundra.**






- **Animals choose food according what their bodies need to survive.**

1. Caracal eats mouse. 2. Rabbits eat grass. 3. Birds eat worms and butterflies.





- Animals eat plants or other animals. G.R?

  - Because they need energy as they cannot make their own food.

- Sun is the main and primary source of energy to all organisms on earth.

Sunlight → Energy transfer to → **plants** → Energy transfer to → **Animals and human**

Shelter: مأوى tundra: سهل جليدى main source: مصدر رئيسى

• *Less. 2: Food is energy.*

- We get energy from ***food*** and ***oxygen***.

- Why do we need energy?
- We need energy to: -

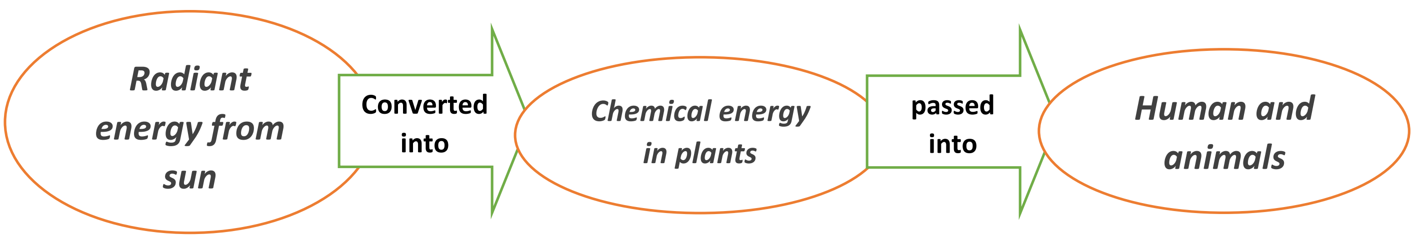
  1- Do activities (running – walking and talking).
  2- To do internal function (heart beats and thinking) even when we sleep.

- Some activities require a lot of energy (hard work and physical exercise)

- How organisms get energy?

1- Produce their own food (plants).
2- From other living organisms. (animals and humans).

Plants	**Animals and humans**
Can make their own food.	Cannot make their own food.
- Use sunlight energy to convert water and carbon dioxide into glucose. (photosynthesis)	- **Get their food from: -** 1. Eating plants only. 2. Eating animals only. 3. Eating both plants and animals.



Require: يتطلب **produce:** ينتج **convert:** يتحول **radiant:** اشعاعى

food chain

-Living organisms are classified according to their way of feeding into: -

1- Producers. **2.Consumers.** **3.Decomposers.**

•Producers: -

- They are organisms that have the ability to make their own food and don't feed on other organisms.
- Example: **plants.**

•Consumers: -

- They are organisms that don't have the ability to make their own food and eat other living organism to get energy.
- **Examples: -**

Primary consumers	Secondary consumers	Tertiary consumers
- Animals that eat plants. - Like many insects	- Eat primary consumers. - Like birds.	- Eat secondary consumers. - They often large meat-eating animals. - Like crocodiles.
		

Producers: كائنات منتجة consumers: كائنات مستهلكة decomposer: كائنات محللة

Primary: أولى secondary: ثانوى tertiary: ثالثى ability: قدرة

- **Decomposers: -**

  - They are organisms that responsible for breaking down or decaying dead organisms through decomposition process.

- Examples of decomposers: fungi, bacteria, worms and millipedes.

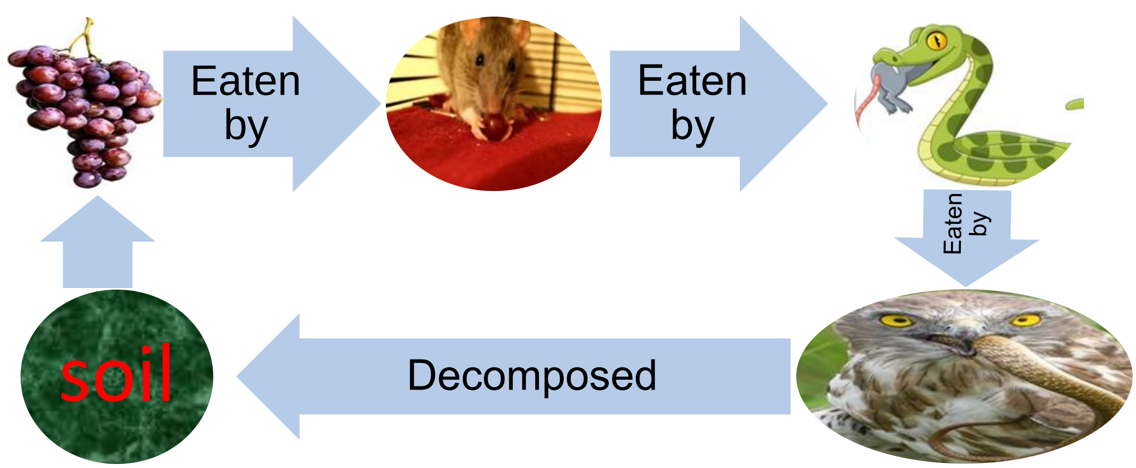
- Millipedes and worms increase the fertility for plant growth. G.R?
- Because they produce waste rich in nutrients.

Food chain

1- It is a model that shows linear set of feeding relationships and movement of energy between living organisms.

2- Model that show how energy transfer from one organism to another in the ecosystem.

- Example: -



Decaying: تحلل fungi: فطريات millipedes: الدودة الالفية

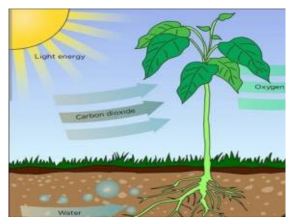
Feeding: تغذية linear set: مجموعة خطية fertility: خصوبة

From the previous food chain we can observe that: -

1- First link is <u>plant</u> ⟶ (producer) ⟶ (can make its food)
2- Second link is <u>mouse</u> (primary consumer) (it eats plants)
3- Third link is <u>snake</u> ⟶ (secondary consumer) (eats primary consumer)
4- Eagle is <u>tertiary</u> consumer <u>because it eats snake.</u>
5- Finally, when the Eagle dies it decomposes and its energy return back to the soil which help plant to grow. (continuity of food chain)

- **Food relationship = energy relationship.**

- The energy passes from sun to plants then to mouse and snake then finally to eagle.



- Green plants can make their food and get energy directly from sun
- Animals cannot get energy directly from sun so, they eat other living organisms.





•***Predator***: ***any animal that hunts and eats another animal.***

•***Prey***: ***<u>any animal that is hunted and eaten by another animal.</u>***

•Both predator and prey pass food and energy through the food chain.

Link: حلقة وصل directly: مباشرة continuity: استمرار

Predator: مفترس prey: فريسة

- Lesson three

-Food chain models: -

(frog – snake – hawk – grass – beetle)

1……………… 2. Beetle 3…………… 4. snake 5……………

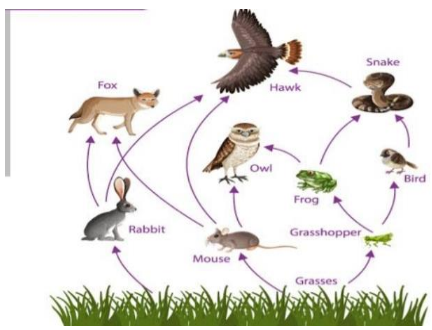
(bird – grass- snake – hawk – grasshopper)

1…………….. 2. Grasshopper 3……….. 4………… 5……………

Give reason: -

- Some living organisms get their energy by eating another living organism.
  - Because they cannot get energy directly from the sun.

Food web



- It is a model that show many different feeding relations between living organisms.

- Simply, food web is made up of (some interconnected food chains)
- Food chains interact within ecosystem to form (food web)

Model: نموذج beetle: خنفساء grasshopper: جراد

Food web: شبكة غذائية interconnected: مترابط

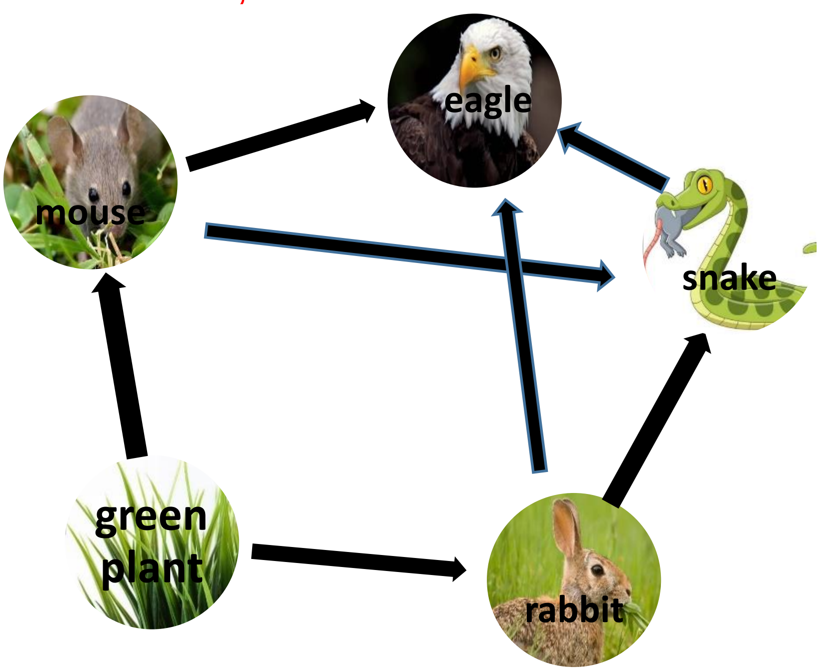
- Food web is used to show how the organisms that live in the same ecosystem depend on each other for survival.

- Design a model of food web using the following: -

-We can observe that: -

1. Both rabbit and mouse eat plant.
2. Snake eats mouse and rabbit.
3. Eagle eats rabbit, snake and mouse.

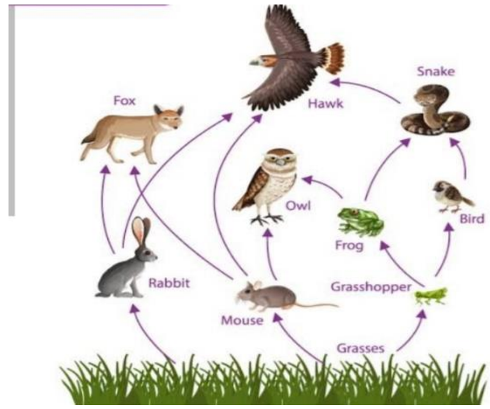


- Food web describe the energy flow and feeding relations between living organisms in the ecosystem.
- Food web will be affected if an organism disappears. G.R?

- Because some organisms will lose their food source.

interactions in food webs.

- Food webs show the connection between living organisms and energy flow where: -



1- Primary consumers eat producers.
2- Some consumers eat other consumers.
3- Some consumers may eat the same prey or producers.

- It is better to use food web than food chain to show the connection between living organism. G.R?

1. Because the food web shows interactions between <u>many food chains</u>.

2. The food web contains <u>many organisms.</u>

3. Food chain show interactions between <u>few living organisms</u>.

- **Ecology:**
  - the study of living organisms and how they interact with their environment.

- **Restoration ecology**: *rebuilding damaged habitats.*

- ***Dr. Becky Barak:***
  - She is a plant-community ecologist.



Ecology: علم البيئة connection: اتصال او ترابط better: يفضل

Restoration ecology: علم الترميم البيئى أو إعادة تأهيل البيئة plant community: مجتمع النبات

• *Concept 3: Change in food webs.*

➢ Factors that affect the ecosystem and food webs: -

1. Climate change.
2. Pollution.
3. Human activities.

• *What is meant by pollution?*

- ***Harms that occur to ecosystem due to substances that can harm living organisms.***



• *Examples of ecosystem change:* -

1. Hot sun cause **water evaporation** from lake in drought regions.
2. Throwing wastes from ships into the sea **pollute the sea.**



• All organisms may be affected by these changes: -

1. Disappearance of plants: -
   1- Consumers move to search for food.
   2- Or they will die.
2. Increasing number of one species: -
   1- Food and shelter may disappear.
   So they will die.

Affect: يؤثر على	pollution: تلوث	drought: جفاف
Disappearance: اختفاء	throwing: القاء او رمى	shelter: مأوى

Mr. Mohamed El-Sadany
Science is simple
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- ***Marine habitats are affected by human activities: -***

  1. **Overfishing** (catching many fish)
  2. **Water pollution** (throwing wastes in water)



Palau

What is happening on land affects the marine environment.

- People in Palau create <u>well-designed</u> and protected marine environment: -

1. **<u>Control</u>** human activities on land to keep marine environment.
   - By avoid throwing wastes in ocean.
2. Prevent fishers from **<u>overfishing</u>** coral reefs, to conserve the marine life.

➢ How food webs can change?

- When organisms are removed or their role change,
  Ecosystem could be destroyed and also food web changes.

Gentle rain in dessert → **Led to** → Ecosystem may be **<u>improved</u>** → **because** →

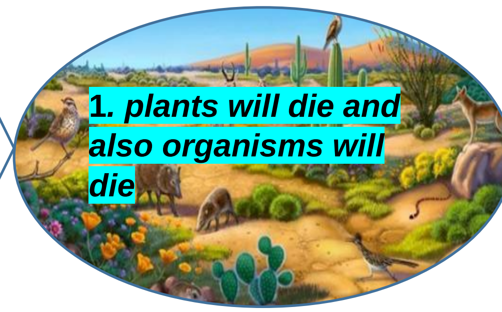


Marine habitat: بيئة بحرية
Protected: محمية
Coral reef: شعب مرجانية
overfishing: صيد جائر
destroy: يدمر
gentle rain: امطار خفيفة
control: يتحكم
conserve: يحافظ
improved: يتحسن

Heavy rain in dessert → **Led to** → Ecosystem may be **harmed** → **because**



Drought and all grass die. → **Led to** → Food web maybe **destroyed** → **because**



Many top predators are present. → **Led to** → Other organisms may be **harmed** → **because**



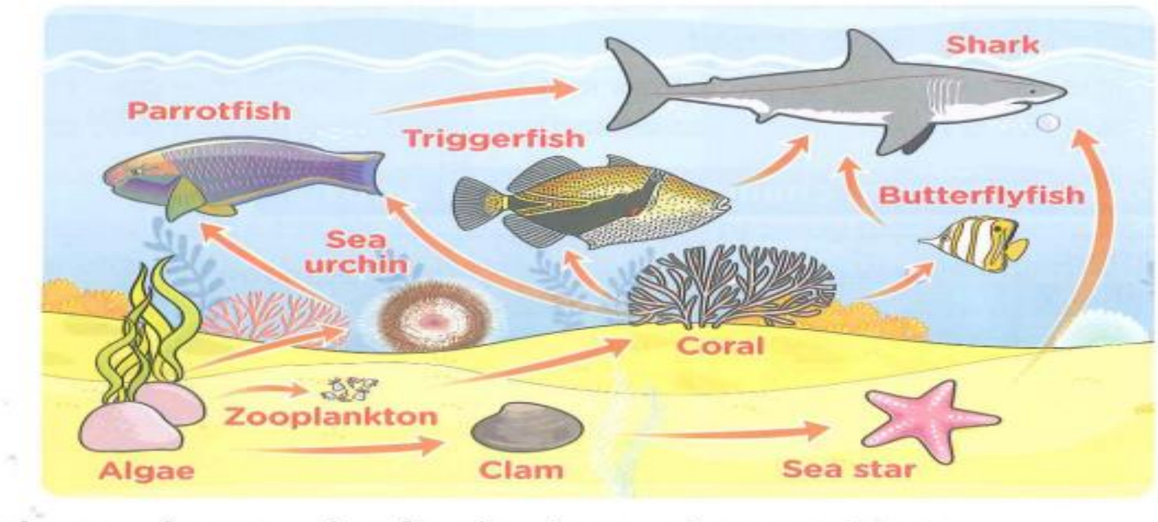
***Top predators**: predators that found at the top of food chains.*

Such as: tigers, lions, sharks, crocodiles, etc…

Heavy rain: أمطار غزيرة　　harm: يضر　　flood: فيضان

Drought: جفاف　　led to: يؤدي الى　　found: توجد

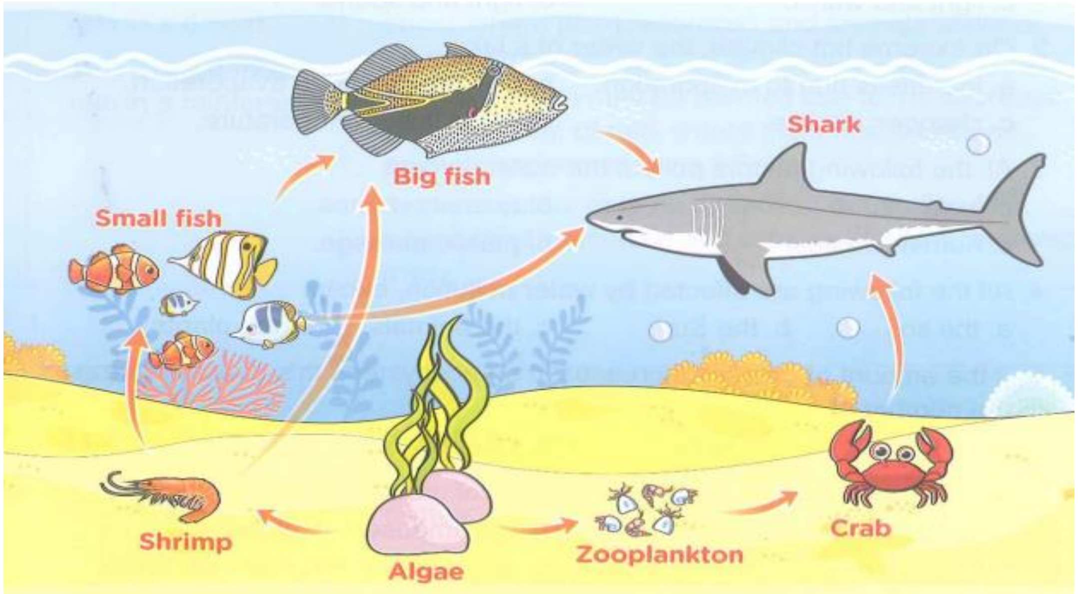
- ***Marine food web: -***



- **From the previous food web, we can observe that: -**

1. *Algae produce its own food.*
2. *Clam, sea urchin and zooplankton are feed on algae.*
3. *Sea star feeds on clam. And coral feed on zooplankton.*
4. *Butterflyfish and triggerfish feed on coral.*
5. *Parrotfish feeds on sea urchin and coral.*
6. *Sharks feed on sea star, parrotfish, triggerfish and butterflyfish.*

Algae: طحالب clam: أصداف بحرية sea urchin: قنفذ البحر
Zooplankton: عوالق بحرية butterflyfish: سمكة الفراشة feed on: يتغذى على
Triggerfish: سمكة الزناد parrotfish: سمكة الببغاء



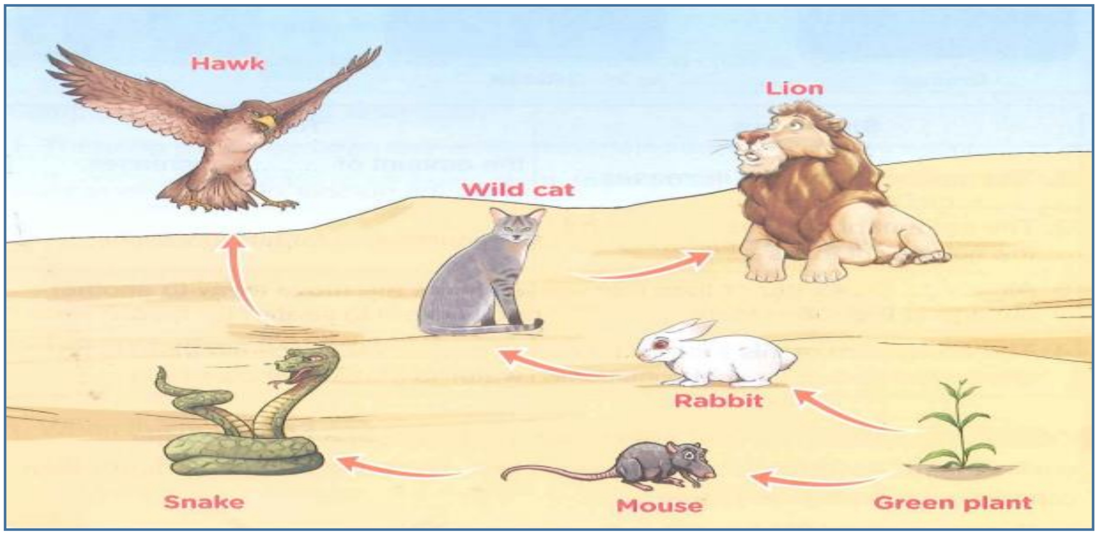
Lock at the previous picture then complete the following: -

1- ………….. produce their own food.
2- ………………..and …………….. feed on algae.
3- ……………………………feeds on zooplankton.
4- ……………….. and ………………feed on shrimp.
5- ………………feeds on crab, small fish and big fish.

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Lesson two

Energy flow model.



Complete the following: -

1. *……………. Is considered a producers.*
2. *…………………and………………..are primary consumers.*
3. *…………………and………………..are secondary consumers.*
4. *…………………and………………..are tertiary consumers.*

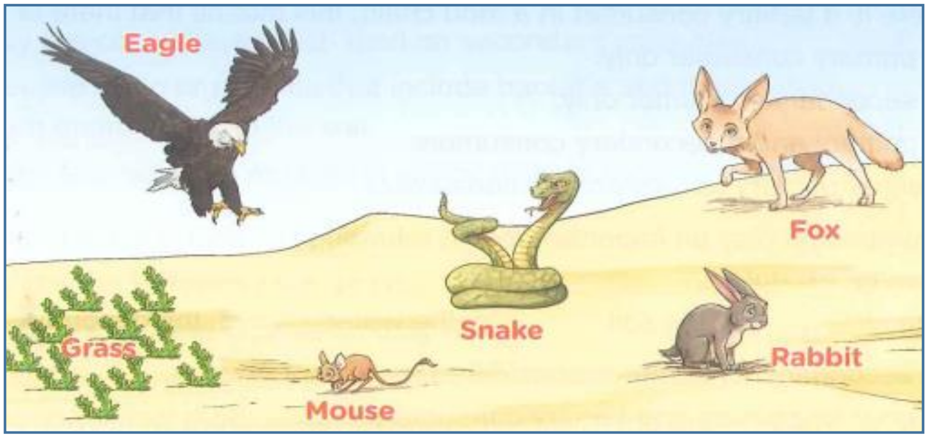
- ***The energy in the overall system remains as the same, were: -***

1. *Energy transfer between organisms when an organism feed on each other.*

2. *Most of the energy is reach the decomposers and they return energy back to the soil.*

Overall system: النظام العام   remains: يبقى   reach: يصل الى

- Draw arrows that show energy flow in desert food web: -



- *What happen when: -*

1. ***All grass is removed from previous food web according to rabbits.***

   - *Rabbits will die.*

2.All grass is removed according to eagle.

   - *Firstly, eagle would not be affected but when rabbits die, eagle would have less food.*

Arrows: أسهم **according to: بالنسبة ل** **affected: تتأثر**

• *Population changes*

***Population**: is the number of organisms of one type of species that live in ecosystem.*

- **Factors affect the ecosystem: -**

1. Amount of water. (high or low)
2. Temperature. (high or low)
3. Climate change.

- ***What happen if?***

1- Climate change is suitable.
- Number of species ***increase.***

2- Climate change is unsuitable.
- Population of species ***decrease*** and they will die or move to better place.

- All species depend on other species for survival, so any increasing or decreasing the number of one species affect the other and lead to ***population change.***

Population: عدد أفراد النوع factors: عوامل affect: يؤثر
Suitable: مناسب depend on: يعتمد على



1. Seabirds build their nests on the top of mountain cliffs
2. They mainly feed on small fish as they dive deep into the sea.
3. Small fish feed on the microorganisms that float on the surface of sea.



1- They are very small organisms, cannot be seen by naked eye.
2- They can make their own food, so they are producers in marine food web.
3- They need cold water to survive.

What happen to microorganisms if the water become warm?

1- Microorganisms will move searching for cold water.

2- Small fish also will move. G.R?
- because the main source of their food is microorganisms.

3- Therefore, some of seabirds will move to new habitat, others will die.

Seabirds: طيور بحرية   mountain cliffs: منحدرات جبلية   dive: يغوص
Microorganisms: كائنات دقيقة   mainly: بصفة أساسية   nest:عش

Lesson 3: habitat loss

- *Healthy habitat is important for living organisms. G.R?*
  - Because it provides air, water, food and shelter that organisms need to survive.



- ***when habitat is destroyed: -***

1- organisms may not be able to survive.
2- Flow of energy will negatively affected.



- ***Human activities that change ecosystem: -***
  1- Building more buildings and roads.
  2- Throwing wastes in water.
  3- Overfishing.

- Human activities affect the weather and temperature of water.
- The previous changes cause habitat loss.
- Habitat loss is one of the main reasons for extinction.

Loss: فقدان healthy: صحى buildings: مبانى

Activities: أنشطة habitat: موطن او معيشة

Negative effect: تأثير سلبى extinction: إنقراض

Coral reefs

- ***corals*** *are small marine animals.*
- ***Coral reefs*** *considered an ecosystem.*



1- They are from the most *diverse* and *valuable* ecosystems.
2- They provide *food* and *shelter* for fish and marine organisms.
3- Coral reefs attract tourists for fishing and diving.
4- They increase the income of some business like in hotels and restaurants.



Coral reef bleaching

- When the temperature of water rises: -

- Coral reef will get rid of the algae that live inside it.
- Then, coral reefs turn into white.
- Due to this bleaching, they often don't survive. (destroyed)

Impact of coral bleaching on different communities: -

1. *On coral and fish: -*

- Marine organisms and fish that depend on coral reef for food and shelter
  May die or move to another habitat.

2. *On human: -*

- People that depend on coral reefs and fish for food will be negatively affected.

Diverse: متنوع	valuable: ذو قيمة	shelter: مأوى	tourists: سياح
Diving: غوص	income: دخل	hotels: فنادق	restaurants: مطاعم
Bleaching: ابيضاض	rises: ترتفع	impact: تأثير	communities: مجتمعات
Get rid of: يتخلص من	negative effect: تأثير سلبى		depend on: يعتمد على

• ***Plastic pollution.***

- *Throwing wastes as plastics affects negatively on marine environment. G.R?*

- Because marine organisms don't find anything to feed on except plastic waste.

• *What happen when the amount of plastic waste increase in the sea?*



1. Number of marine organisms ***decreases.***
2. Breakdown in the flow of energy.
3. Marine food webs will be affected.

• **Whales**, **sea turtles**, **seabirds** and **fish** can't often differentiate between **plastic** and **food**.



#- how do sea turtles get harmed by feeding on plastics?

1- *It can't differentiate between plastic and jellyfish.*
2- *So it eats a lot of plastics thinking that it is a jellyfish.*

#- how do coral reefs get harmed by feeding on plastics?

1. *Sunlight contain UV rays that breakdown plastics into small pieces called (micro plastics).*
2. *Coral reefs filter seawater to get their food.*
3. *They ingest micro plastics so they get harmed.*





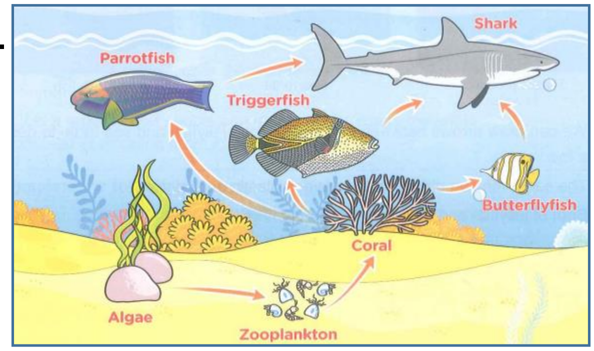


1- *About **8 million** tons of plastics are thrown in water **every year.***
2- *Plastics are very harmful for marine organisms, because they are **toxic** and **sharp.***
3- *We can **recycle** plastics products instead of throwing them.*

Feed on: يتغذى على   breakdown: انهيار   micro plastic: جسيمات بلاستيكية

Sea turtles: سلاحف بحرية   filter: يرشح   ingest: يبتلع

Impact on a food web.



- *Coral reefs are considered: -*

  1. ***Food source*** *for many primary consumers.*
  2. ***Shelter*** *for many marine organisms.*

So that: destroying of coral reefs leads to destroying marine food web.

what happen if coral reefs disappear of marine ecosystem?

1. *Parrotfish, triggerfish and butterflyfish will die.*
2. *Food of shark will decrease, so it may die.*
3. *Algae that live inside the coral tissue will lose their habitat.*
4. *Organisms that depend on coral reefs for food or shelter will die.*

- ***Habitat restoration***

-Returning habitat back to its natural state before pollution.

- *Importance of restoration: -*
  1. Repairing all parts of the environment.
  2. Prevent extinction of animals.

-It takes *long time* and need *a lot of work* but it has very positive results.

Impact: تأثير　　source: مصدر　　shelter: مأوى　　destroying: تدمير

Habitat restoration: إعادة إصلاح البيئات　　natural state: الحالة الطبيعية

Repairing: إصلاح　　prevent: يمنع　　positive results: نتائج إيجابية

- ***Rebuilding coral reefs.***

➢ ***Coral reef rehabilitation project: -***

- ***Occurs in Arabian gulf.***
- ***Scientists collect different samples of coral reefs and move them to nursery.***

> ***Nursery: place in which scientists take care of coral reef pieces until they grow and reproduce to make new coral reefs.***

➢ *Protecting coral reefs from plastic pollution:* -

- *Coral reefs of red sea are home for many organisms.*
- *People in coastal communities applied a new way of life (**zero plastics**) where: -*
  1. *Replace plastic forks with wooden ones.*
  2. *Replace plastic bags with cloth ones.*

- *If the habitat is not restored, many organisms cannot find their needs to survive so, they will be lost.*

Arabian gulf: الخليج العربى   rehabilitation: اعادة تأهيل   nursery: مشتل

Replace: يستبدل   coastal communities: مجتمعات ساحلية

• *Concept 2.1: Matter in the world around us*

What is meant by matter?

1. anything that has *mass* and *volume*
2. Or anything that has *mass* and *take up a space.*

• *Volume*: the space that taken by matter.

➢ ***Matter can be found in three main states: -***



1.	Solid state.	Ice or wood
2.	Liquid state.	water
3.	Gaseous state.	Water vapor

it's very important for scientists to know the properties of matter. G.R?

1- To help them describe the matter and differentiate between different matters.
2- All thing in the world is made up of matter.

• Properties of matter such as: -
  - Color – shape – size –texture –hardness –temperature…etc.

• Any matter composed of tiny particles.
• These tiny particles cannot be seen with naked eye.

Matter: مادة   mass: كتلة   volume /size: حجم   space: مساحة

State of matter: حالة المادة   solid: صلبة   liquid: سائل   gas: غاز

Properties: صفات او خاصة   differentiate: يفرق   texture: ملمس

Hardness: صلابة   tiny particles: جسيمات صغيرة   temperature: درجة الحرارة

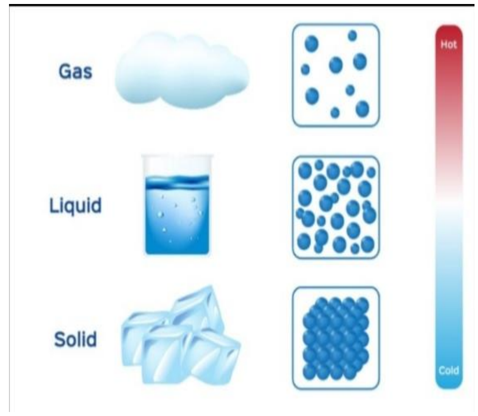
• *States of water.*

- Water can be found in three states: -

1- Solid (ice)

2- Liquid (drinking water)

3- Gas (steam / water vapor)



- Water can be <u>*changed*</u> from one state to another.

• ***Everything is made up of matter such as: -***

1. Water 2. Body of Living organisms. 3. Wood 4. Air.

• Each matter has a specific properties (characteristics).

- *Properties of matter help us to describe it: -*

1. Color: matter may be colored by: -





- *One color*
- *Many different color*
- *Colorless such as (air – oxygen – transparent glass)*

2. Size (volume):it may be: -




- *Vey big (planets – stars - celestial bodies).*
- *Tiny (very small) such as <u>germs</u> (we cannot see them).*

States of matter: حالات المادة characteristics: خصائص

Size: حجم *celestial bodies:* أجسام فضائية *tiny:* صغير جدا

3. *Temperature: may be: -*

- *Hot* 
- *cold* 

4. *Shape: -*



- *Round (ball)*
- *Square (block)*

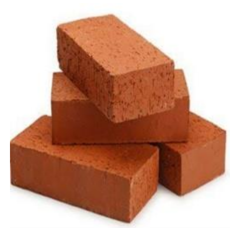


- *Triangular (pine tree)*



5. *Hardness: -*

- *Hard like* ***brick***
- *Soft like* ***rubber*** *or* ***feather***

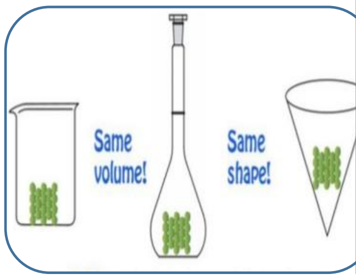
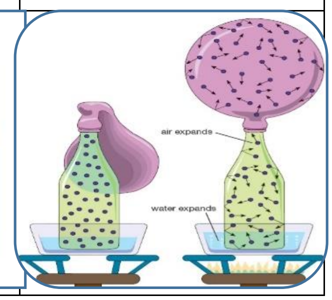




- ***Solids:*** *wood – stone –sand – iron –ice.*
- ***Liquids:*** *water –milk –gasoline –vinegar –oil.*
- ***Gases:*** *oxygen –nitrogen –carbon dioxide –air –water vapor.*

Triangular: مثلث hardness: صلابة vinegar: خل

observing matter

P.O.C	solid	Liquid	Gas
Volume	Definite	Definite	Not definite
Shape	Definite	Not definite	Not definite
Example			

- Liquids take the shape of their containers. G.R?
  - Because they don't have definite *shape.*

- Gases take the shape and volume of their containers. G.R?
  - Because they don't have definite *shape* and *volume.*

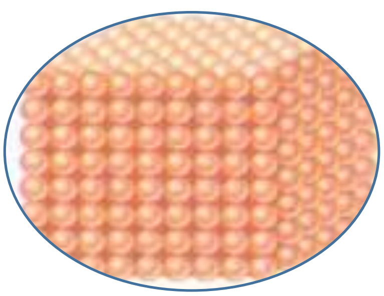
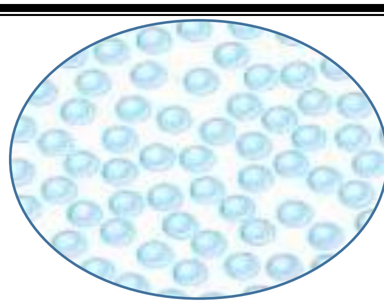
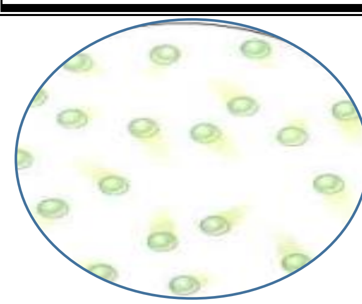
- ***Some gases are invisible such as air. But: -***
  1. ***We can feel the air when the wind blows and moves objects.***
  2. ***We can see a balloon gets larger when we blow air into it.***

Definite: محدد container: حاوى invisible: غير مرئى

- Matter consists of very tiny parts called particles.
- Particles of matter are in state of ***continuous motion.***

- Comparison between particles of solids, liquids and gases: -

Particles of solids	**Particles of liquids**	**Particles of gases**
1. Very close to each other (narrow spaces)	1- There are more space between them than solids.	1-There are very large spaces. (more free)
2. limited motion	2- move more freely.	2-move very freely.
3.Less energy	3-More energy.	3-A lot of energy.

- We can determine the state of matter from: -
  1- Its properties.
  2- The motion of its particles.

Particles: جزيئات   continuous motion: حركة مستمرة   space: مسافة

- ***Measuring the matter: -***

- ***Some properties can be measured such as: -***

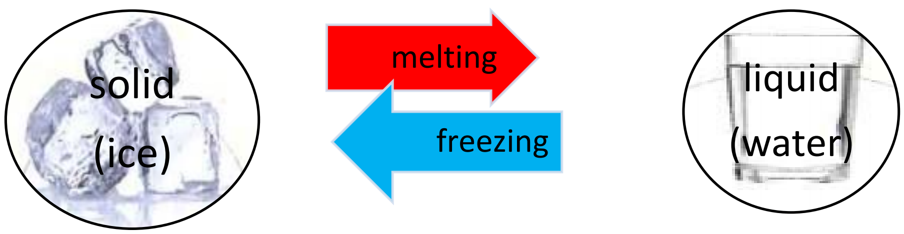


  1- ***Length:*** ***using ruler or measuring tape.***

  2- ***Mass:*** ***using scale.***



- ***Matter can change from one form to another: -***



- ***Sound and light are forms of energy <u>not considered as a matter.</u>***

Measuring tape: شريط قياس　　scale: ميزان　　melting: انصهار　　freezing: تجمد

states of matter.

- ***Matter can be solid, liquid or gas.***

Solid	Liquid	Gas
They have a **fixed shape** And **fixed volume.**	They have a **fixed volume** and **don't have** fixed shape.	They don't have **fixed shape** and **volume.**

- **Any state of matter takes up a space.**
- **The same space cannot be occupied by two objects at the same time.**

- ***We can: -***

1- Feel matter like air.
2- See matter if it was visible.
3- Smell matter if it has an odor.

- **Matter consists of millions of tiny particles that we cannot see with our eyes.**
- **Very small matters like germs and air consists of smaller particles also.**

Fixed shape: شكل ثابت　　fixed volume: حجم ثابت　　occupied: مشغول

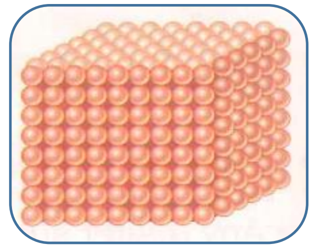
Visible: مرئى　　odor: رائحة　　germs: جراثيم

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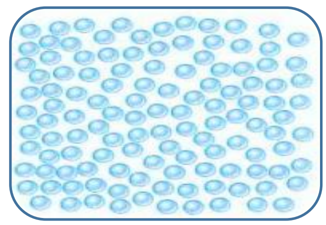


- The building units of matter are **<u>particles.</u>**
- We use **<u>regular microscope</u>** to see particles.

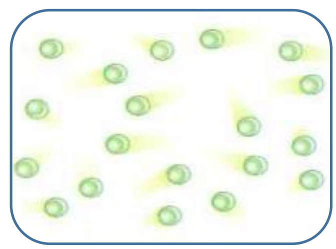
  - **Particles of the <u>same matter</u> are <u>similar.</u>**
  - **Particles of <u>different matters</u> are <u>different.</u>**



- **Solid particles: (very close to each other)**
  1- Vibrate or move around their place.
  2- Cannot slide over each other.



- **Liquid particles: (held together weaker)**
  1- Move faster than solid particles.
  2- Can slide over each other.



- **Gaseous particles: (not held together)**
  1- Move very quickly in all directions.
  2- Can fill up any container whatever its volume.

Building unit: وحدة بناء regular microscope: ميكروسكوب عادي

Vibrate: يهتز slide: ينزلق held together: متماسكة

modeling the particles of matter.

-***Using models: -***

- *Method to understand scientific concepts and make it more **obvious.***
- *Models help us to study: 1- very small objects. (germs)*
  2-very large objects. (solar system)

- we can use ping pong balls to show the motion of particles. G.R?
- because they are separated and have three dimensions.



- ***Tiny particle size.***

-**Particle size depend on: -**

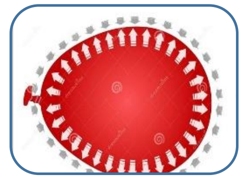
*1- **Type** of particles.*
*2- Way of particles **connection.***

- *Only one hair is about **150,000 – 300,000** particles.*
- *The average size of particles is **so tiny.***

- *Electronic microscope is used to see the components of particles such as one blood cell.*

Models: نماذج *scientific concepts: مفاهيم علمية*
Obvious: واضح *dimensions: أبعاد* *connection: ارتباط*
Electronic microscope: ميكروسكوب الكترونى *blood cells: خلايا الدم*

- *To show the existence of invisible particles.*



1- *Fill a balloon with air.*
2- *Air particles **move rapidly** and hit the balloon from inside.*
3- *Force of air particles inflate the balloon and give it round shape.*

What happen: -

1- *If you squeeze the balloon gently.*
- *The air particles **get closer** to each other.*





2- *If you squeeze the balloon more hardly.*
- *It will **pop** and air particles will escape.*

Existence: وجود   *invisible:* غير مرئى   *get closer:* تقترب
Squeeze: يعصر او يضغط   *gently:* برفق   *pop:* فرقعة

models

- *What is meant by model?*
- *It is a copy of the real thing in different size.*

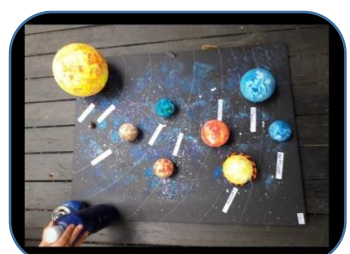
- *Model may be 1- drawings 2- objects. 3- ideas.*
  To represent real 1- event 2- objects. 3- process.

- *Models move, work and lock like what they copy.*
- *Models can describe very big objects in smaller size.*
  And very small objects in bigger size.

1.*Earth: -*



-A globe represents a model of earth show: -
  a- Shape of earth
  b- The location of countries.
  c- The area that covered with water on earth.



2. *Solar system: -*

- *Model of solar system help us to: -*
  a- See all planets.
  b- Compare between planets according to size and distance from the sun.

Copy: نسخة *ideas:* أفكار *event:* حدث

3. *Germs: -*

- *They are very tiny objects that spread and make us sick.*
- *Models of germs help us to: -*

a- See it without microscope.
b- See parts of germs that help them to spread.



- ***Models help us to know how objects work?***



1. Model of volcano: help us to know: -

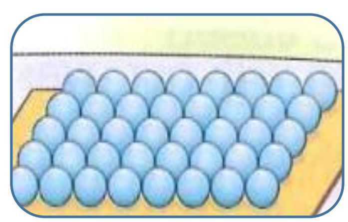
a-The shape of volcano
b-How lava come out of the volcano during eruption.



2. Model of airplane: help us to know: -

a-How it flies up into the air.

- ***Modeling states of matter: -***
  - *We can use some beads and arrange them to show the difference between matter states as the following: -*



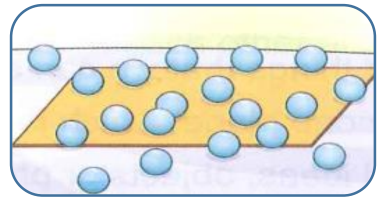
1- Solid state:

a. particles have regular arrangement
b. Well organized.

Sick: مريض *eruption: ثوران* *beads: خرز*

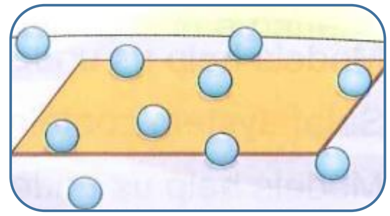
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2- Liquid state: -



a- Particles have random arrangement
b- Not well organized.

3- Gaseous state: -



a- Particles have random arrangement.
b- Not organized at all.

- ***Careers and states of matter***

-During cocking we can observe three states of matter.

1- **Solids**: rice, pasta and frozen vegetables.
2- **Liquids**: water, oil and vinegar.
3- **Gases**: steam of boiling water and natural gas.





Using science during cocking: -

1- Boiling water to cock rice or pasta.
2- Keep the vegetables fresh and valid for long time by freezing.
- Because microbes cannot reproduce well in low temperature.
3- Liquids such as juice and milk change into solid by freezing.

Arrangement: ترتيب organized: منظم random: عشوائى

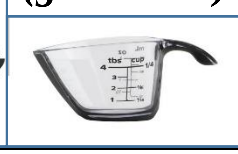
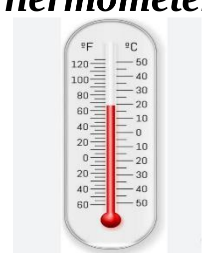
Careers: وظائف observe: نشاهد

Concept 2.2: *Describing matters*

- ***Matter can be described by its properties such as: -***
  - {color-shape-odor- texture-size}
- ***People use different kinds of materials to make roof of homes depending on the climate where the home is located: -***

Type of material.	***Properties***	***Used in: -***
1-Strong stone.	- *Flat.* - *Protect the home from dust and dirt.*	
2-Ceramic brick. ***Ceramic tiles***	- *Inclined. (slanted)* - *Protect home from rain.*	
3-Leaves and stick.	- *Inclined* - *Protect home from animals.*	

- ***Measuring matter: -***

Property	***Mass***	***Volume***	***Length***	***Temperature***
Tool	***Balance scale***	***Measuring cub (graduated)***	***Ruler*** ***Measuring tape***	***Thermometer***
				

- ***We may need to measure more than one property to determine the material. G.R?***

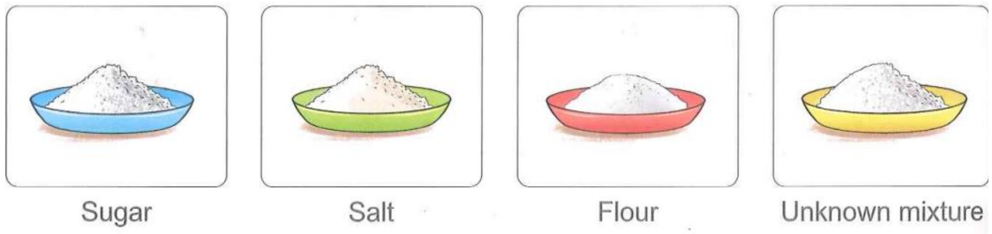
- ***To be sure that is it the suitable material you can use or not.***

Slanted: مائل ***graduated: مدرج*** ***suitable: مناسب***

- ***physical and chemical properties.***

-If you have: -

1-Plate of sugar.
2-Plate of salt.
3-Plate of flour.



4-Unknown mixture of two substances from the previous matters.

- ***How can you determine the type of materials that form this unknown mixture?***

1. *Examine the texture of all substances with your hand.*
2. *Check the odor of each substance.*
3. *Use the lens to know the size of crystal in each substance.*

- ***Observation: -***

1- All materials have the same color (white).
2- Each matter has a special odor. (different from each other).
*3- Sugar has **large** size crystals.*
*4- Salt has **small** size crystals.*
*5- Flour has **very fine** crystals.*

6- Unknown mixture contains large and very fine crystals.

- *Now we can know that this mixture is composed of **Sugar** and **flour.***

Flour: دقيق **unknown: مجهول** **mixture: مخلوط**

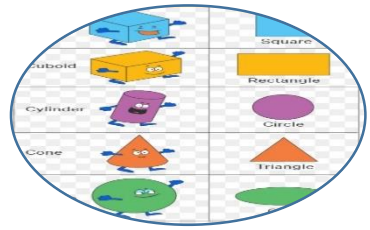
Examine: يفحص **fine: ناعم جدا** **lens: عدسة**

Check: يتحقق او يتاكد **crystals: حبيبات/بللورات**

1-Physical properties: -

- *It is the properties that can be **sensed** (observed using senses).*
- *We use words like: smooth, rough, red, round to describe them.*





- *Color*
- *Shape*

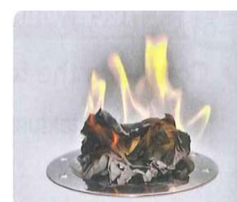




- *Odor*
- *Texture*

2- Chemical properties: -

- ***It is the properties that you can observe its effect (change) on materials.***
- ***They appear when materials interact with each other.***





- ***Burning of paper: - (rapid reaction with oxygen)***
  - ***Paper** **react with fire** **and** ash is produced.*
- ***Rusting:** - (slow reaction with oxygen in presence of water)*
  - *When iron nail reacts with **air** and **water**, it forms **rust layer.***

Physical properties: خصائص فيزيائية / ظاهرية *rapid:* سريع

Chemical properties: خصائص كيميائية *rusting:* صدأ

- ***Volume and mass***

P.O.C	***volume***	***mass***
Definition	• *The space that taken by matter.*	• *The amount of matter in the object.*
Measuring units	*1. Litter (L).* *2. Milliliter (mL).* *3. Cubic centimeter (cm^3).*	*1- Gram (g).* *2- Kilogram (kg).*
	$1L=1000ml=1000cm^3$	*1kg= 1000 g*
Example.	*One litter of water.*	*Paperclip equal about one gram.*

- ***Temperature: -***

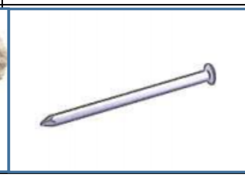
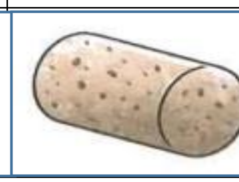
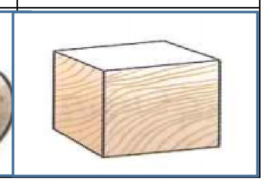
- ***Measure of how quickly the particle in the matter move.***
- *By* ***increasing*** *the heat of the matter, the motion of its particles will* ***increase.***

- ***Mass, volume and temperature are from physical properties of the matter that can be measure.***

Paperclip: دبوس ورق ***cubic:*** مكعب ***quickly:*** بسرعة

- ***measuring properties.***

- ***Lock at the following table: -***

Matter / property	**Stone**	**Iron nail**	**cork**	**Wood**
Effect of magnet.	*Not attracted*	*Attracted*	*Not attracted*	*Not attracted*
Mass (g).	*50*	*30*	*100*	*20*
Sink or float	*Sink*	*Sink*	*Float*	*Float*
				

We can conclude that: -

- *Some materials are* <u>*attracted*</u> *to magnet (**magnetic** materials)*
- *Other materials are* <u>*not attracted*</u> *to magnet (**non-magnetic**)*

- *Floating and sinking don't depend on the* <u>*mass.*</u>

➢ *What happen to the mass of object if its shape change?*

- *The mass will not change (still constant)*

➢ *Mass is affected by **increasing** or **decreasing** the amount of matter.*

Magnet: مغناطيس float: يطفو sink: يغوص

Cork: فلين constant: ثابت conclude: يستنتج

- ***Use the given data to compare between the following matters: -***

Material 1	***Material 2***	***Material 3***
Mass= 180 gram	*Mass= 150 gram*	*Mass= 100 gram*
Length= 40 cm	*Length = 55 cm*	*Length = 25 cm*
Volume = 100 ml	*Volume = 115 ml*	*Volume = 5 ml*

- Based on the previous data, complete the following: -

1- Material that has the biggest mass is ………………………

2- Material that has the largest volume is ……………………

3- Longest material is ……………………………………

Compare: يقارن data: بيانات mass: كتلة length: طول

- ***(useful properties of matter)***

Helium

physical properties: -

1- It is a light gas (lighter than air)

chemical properties: -

1- Not toxic (poisonous)
2- Not flammable (not burned)

S0 that, we can use it safely.

- ***Flammable material:*** *material that burns and form fire.*



- ***Uses of helium: -***
- ***It is used in filling of: -***

1- Balloons
2- Blimps



- ***Balloons and blimps that filled with helium rise up in the air. G.R?***
  - *Because helium is lighter than air.*

Useful: مفيد *light gas:* غاز خفيف *poisonous:* سام

Flammable: قابل للاشتعال *uses:* استخدامات *blimp:* منطاد

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Copper



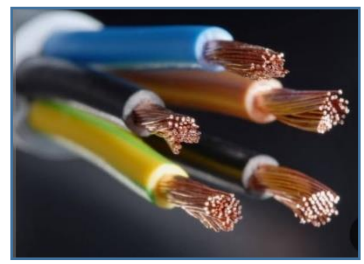
physical properties: -

1- Good conductor of heat.
2- Good conductor of electricity.
3- Can be stretched into thin and flexible wire.

Conduction: *ability of matter to pass heat and electricity through it.*

- ***Uses of copper: -***
  - It is used in making: -

1- Electric wires.
2- Cooking pans.



Material	***Properties***	***Uses***
Rubber	**1- Flexible.** **2- Water proof.**	 Tires  Gloves  Athletic shoes
Glass	**1- Smooth.** **2- Transparent.**	 Windows  Eyeglasses
Steel	**1- Hard.** **2- Strong.**	 Screwdrivers  Hammers

Copper: نحاس   conduction: توصيل   flexible: مرن   wires: أسلاك

Concept 2.3: comparing changes in matter

- The mass of matter doesn't change when it is: -

1- Heated
2- Cooled
3- Mixed with other matter

- *Melting matter*

what is meant by melting: -

It is a process in which matter change from solid to liquid by heating.

Example: - leaving bowl of ice cubes in hot water.

- Ice will melt and change into liquid state.

- *We must keep the solid matter under a certain temperature to stay in solid state.*



melting: انصهار *bowl: وعاء* *mix: يخلط او يمزج*

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- ***Changes in matter***

Solid matter: 1- have *definite* shape and volume.

2- they are *hard.*

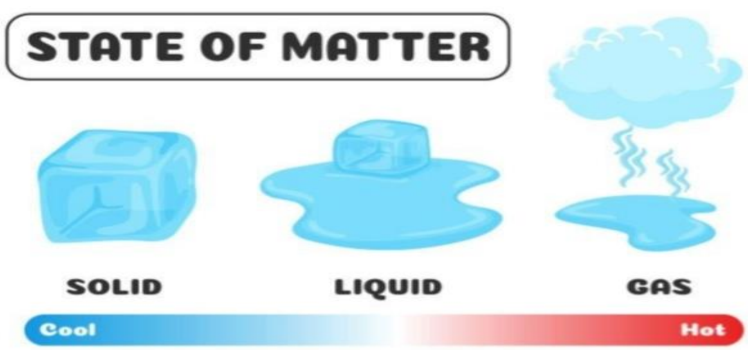
Liquid matter: 1- they have definite volume and not definite shape.

2- so, they *take the shape* of their container.

Gaseous matter: 1- they don't have definite shape and volume.

2- so, they *take the shape and volume* of their container.

- *Matter can be changed from one form to another without any change in its amount (mass), which mean: -*
- ***The total number of particles remain constant. (not changed).***



Hard: صلب definite: محدد total number: العدد الكلى

• *Particles in motion*

- Any kind of energy *not considered* as a matter.
- ***Thermal*** energy is a kind of energy in the form of heat.
- We use thermal energy in: -
  1. ***Cooking***
  2. ***Warming***
- Sun produce thermal energy to keep living organisms alive.

- *We knew that particles of all matter states are in state of continuous motion.*

- There is a relation between the particles motion and their temperature.

- When particles absorb **thermal** or **light** energy, they will **move, vibrate and spin faster.**

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what happen when: -

1- Particles are cooled. (temperature decreases).
- They will move slower and come close to each other.

2- Particles are warmed up. (temperature increase).
- They will move faster and spread out.

Thermal: حرارى vibrate: يهتز spread: ينتشر

Changing state of matter

- **Matter can be changed from one state to another state be changing the temperature as the following: -**

1- By heating solid matter, it converts into liquid. **(melting)**
2- By cooling liquid matter, it converts into solid. **(freezing)**

- *Any matter has amount of thermal energy.*
- *State of matter changes when it loses or gains energy.*

if we leave chocolate bar (solid) exposed to sunrays.

- *It will change from solid to liquid state.*

Physical change: it is a change in matter without changing its structure.

- ***Melting*** and ***freezing*** processes are considered physical change. G.R?

- ***Because the state of matter changed without any change in the structure.***

Convert: يتحول   lose: يفقد   gain: يكتسب   exposed: يتعرض

- ***In melting process:***

matter <u>gain</u> energy ➡ particles move <u>faster</u> ➡ converted into <u>liquid.</u>

Example: When ice temperature *<u>increase above 0º C</u>*, it ***<u>melts.</u>***

heating ICE ➡ particles move faster ➡ change into liquid water

- ***In freezing process:***

matter <u>lose</u> energy ➡ particles move <u>slower</u> ➡ converted into <u>solid.</u>

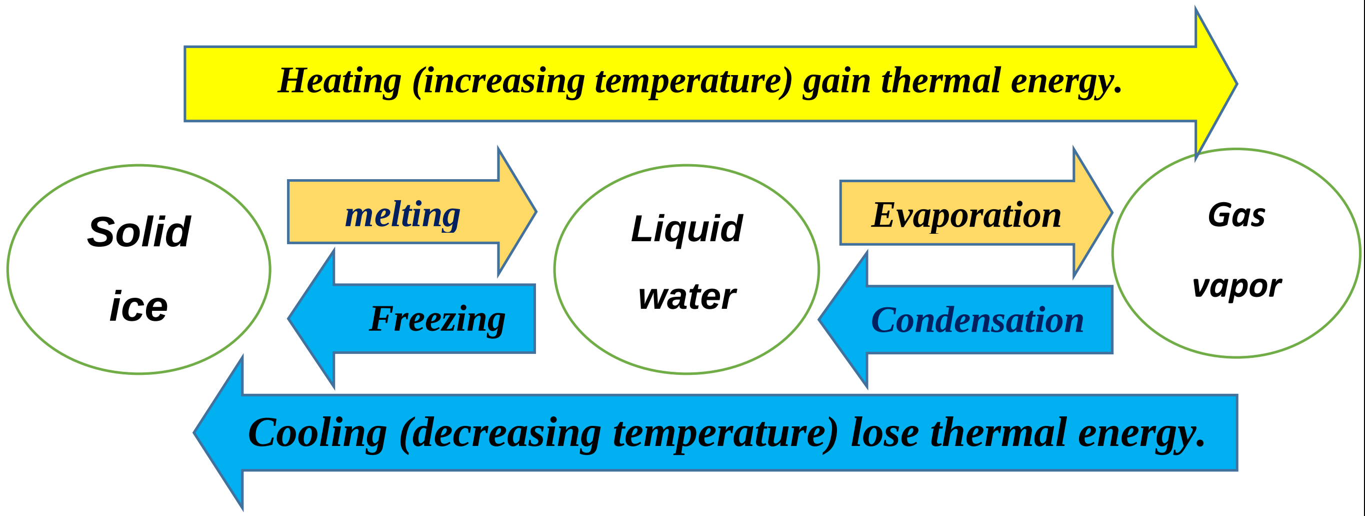
Example: When water temperature decrease *<u>below 0º C, it freezes.</u>*

cooling water ➡ particles move slower ➡ change into ice.

- ***<u>0º C</u>*** is the freezing point of water.
- ***<u>º C</u>*** is the measuring unit of temperature.

Above: فوق او أعلى   below: تحت   measuring unit: وحدة قياس

Mr. Mohamed El-Sadany
Science is simple
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Important definitions: -

1- melting process: -

- change of matter from solid to liquid by heating.

2- Evaporation process: -

- Change of matter from liquid to gas by heating.

3- Condensation process: -

- Change of matter from gas to liquid by cooling.

4- Freezing process: -

- Change of matter from liquid to solid by cooling.

Condensation: تكثيف   evaporation: تبخر   process: عملية

• *Mixtures*

What is meant by mixture?

- **Combination of two or more substances without any chemical change in their structure.**

Examples of mixtures: -



1- solid mixtures
   - Fruit or vegetables salad.
   - Salt and pepper.
2- Solid and liquid: -
   - Salty water.
3- Liquids
   - Water and oil.
   - Water and alcohol.
4- Gasses: -
   - Atmosphere. (air)

- ***Properties of mixtures: -***
  1. *They composed of two or more substances.*
  2. ***Their components: -***
     - ***don't combine chemically (physical combination).***
     - ***Keep their properties. (don't react together).***
     - ***Can be separated after mixing.***
- ***Components of many mixtures are difficult to be seen.***

Mixture: مخلوط *combination:* اتحاد او اندماج

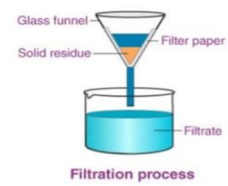
Atmosphere: غلاف جوى *components:* مكونات *react:* يتفاعل

• *Separating mixtures*

1- Filtration: -

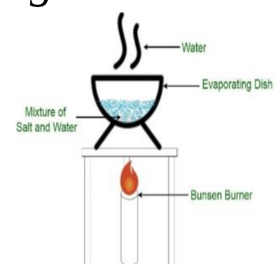
- *It is a method to separate two or more mixed materials when they are different in the size of their particles.*

Example: mixture of water and sand.



2- Evaporation: -

- *It is a method to separate two or more mixed materials when they are different in their evaporation degree.*



Example:

if you heat some salty water.

- *water will evaporate leaving salts in the bottom of vessel.*

What is meant by compound?

It is a matter formed from chemical combination between two or more substances.

Separating: فصل	filtration: فلترة او ترشيح	method: طريقة

Bottom: قاع	vessel: وعاء	evaporation: تبخر	degree: درجة

- ***mixing it up with mass***

-***On forming a mixture: -***

1- The total masses of materials before mixing ***equal to*** their masses after mixing.
2- Their properties don't change

Example: mixing salt and pepper, oil and water.

-***On forming a compound: -***

1. The total masses of materials before mixing ***equal to*** their masses after mixing.
2. Their properties will ***change.***



Examples:

1- When mixing vinegar and baking soda.

- *Carbon dioxide gas will be formed causing bubbles.*



2- When adding cornstarch to iodine.

- *Dark blue colored compound will be formed.*

Mixing: مزج *forming: تكوين* *before: قبل*

Pepper: فلفل أسود *compound: مركب* *bubbles: فقاعات*

physical change: -

- *Change in matter **without** changing its structure.*
- *Change in shape, size or state of matter.*
- *no formation of new matter.*

- *Examples on physical change: -*

1-cutting paper.

2-Making salad.

3-Melting wax.

4-Freezing water or melting ice.

chemical change: -

- *Change in matter **with** a change in its structure.*
- ***New matter will be formed.***

- *Examples on chemical change: -*

1-Burning of paper:

- produce heat, light and ash is formed.

2-Mixing vinegar with baking soda:

-gas bubbles appear.

3-Baking a cake:

-taste of cake is differ from its components.

Physical change: تغير فيزيائى　　　*chemical change: تغير كيميائى*

Matter A + matter B → **Chemical Reaction** → *matter C + matter D*

- *When A and B react together they will form new materials (C &D).*
- *Original materials(A&B) differ than products (C&D) In: -*
  1-Physical properties.
  2-Chemical properties.



Example: -

1-Iron + (oxygen + water) → **Chemical Reaction** → *iron oxide (reddish color)*

1- (carbon + hydrogen) + carbon → **Chemical Reaction** → ash + heat

2-Vinegar + baking soda → **Chemical Reaction** → gas bubbles

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Chemical reaction: تفاعل كيميائى products: نواتج

Oxide: أكسيد reddish: محمر

- Some important chemical reactions occur inside the human body and help in ***food digestion.***
- *Chemical changes are* ***hard to be reversed.***

evidence on physical changes: -

1- Change in size. Cutting paper.
2- Change in shape. (flow of sand in hourglass)
3- Expected change in color. (food color+ water)
4- Change the state of matter. (melting or evaporation).

evidence on chemical changes: -

1- Unexpected color change. (iodine + starch)
2- Formation of gas bubbles. (baking soda+ vinegar)
3- Formation of strong odor. (leaving milk outside the fridge)

Digestion: هضم reversed: تعكس evidence: دليل

Iodine: يود odor: رائحة unexpected: غير متوقع

- 70 % of the earth`s surface covered with oceans. (plenty of water)
- *We cannot drink water of oceans. G.R?*
  - Because it is a mixture of water, salts, other minerals, gases, living organisms and dead bodies.

- Many people around the world cannot reach fresh water.

- We can use desalination process to drink water of oceans.

Desalination: *removing salts from water.*

Desalination process divided into: -

1- **Filtration process: -** to remove larges things (sea weed, shells and fish) but still undrinkable.

2- **Evaporation: -**
   - When we boil water, it rises up leaving salts and minerals.
   - Cooling water vapor to be condense and turns into water (drinkable)

Oceans: محيطات　　fresh water: ماء عذب　　removing: إزالة

Desalination: تحلية (نزع الأملاح)　　plenty: وفرة　　seaweed: أعشاب بحرية

Divided: ينقسم　　boil: يغلى　　drinkable: صالح للشرب

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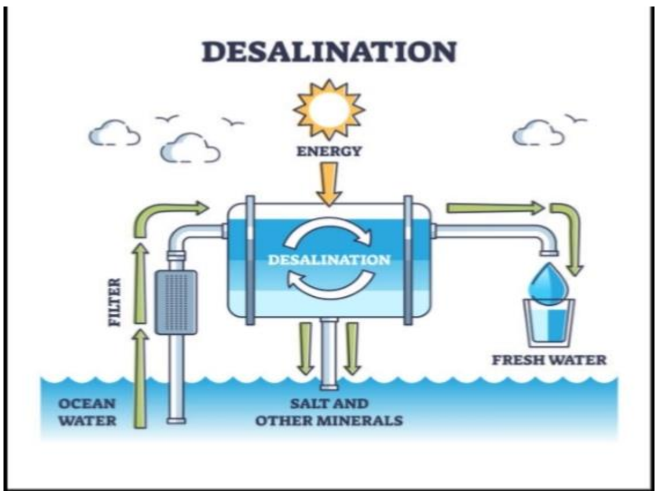
- **Problems of desalination process: -**

1- *Very expensive.*
2- *Need a lot of energy.*
3- *Lead to environmental problems:*

A- Harm small marine organisms. G.R?
- *Due to sucking of water for desalination.*

B- high concentration of salts can harm marine organisms.

- *The human body loses water faster when we drink salt water (**dehydration**).*
- *There are more than **80** plants for desalination in Egypt.*



تم بحمد الله

اللهم ارزقنا الإخلاص فى العمل

Expensive: غالي
sucking: امتصاص
concentration: تركيز
Dehydration: نزع الماء
plants: مصانع
harm: يضر